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ABSTRACT

Described is an educational method based on the application of behavioral theory said to be effective in teaching academic and personal-social behaviors to young retarded children. Reading, spelling, arithmetic, writing, and language programs are presented in moderate detail and are explained to adhere to heuristic procedure of identifying the behavior to be learned, analyzing the desired behavior in behavioral terms, programing the behavior provisionally, experimenting with the program, and making necessary modifications. Three stated reasons for the differential development of academic and personal-social behaviors are the disparity between quantity of quality educational material available for the two behaviors, the disparity between monitoring academic behaviors under external stimulus control and personal-social behaviors under control of self-generated stimuli, and social disagreement on nature of desirable personal-social behaviors. Examination of programing response contingencies focuses on the teacher's psychological knowledge of the task involved, the child's related repertories, and the manner response contingencies strengthen and maintain behavior. Also analyzed are programing of setting factors and personal-social traits, entrance assessment, program planning and modification, and teacher aides. (CB)

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Education and Training of the Young Retarded Child[1]

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There are at least six million retarded individuals of all ages in this country who can profit from education and training. Of this number, about five and a half million, or 92%, are capable of attending school. For the past 75 years, the general public and educators alike have expressed and acted upon their concern about providing adequate training for this too-frequently neglected group by supporting state and federal legislation that advocate special programs. So, for many years there have been special classes for retarded children and college curricula for training special teachers. Unfortunately, surveys have shown that the outcomes of these efforts have been less than exciting (e.g., Johnson, 1962).

Rather than speculate on the reasons that special classes have failed to meet expectations, it is more constructive to propose an approach to teaching that has promise. A method of instruction based on the application of empirical behavioral theory (Bijou & Baer, 1961 and Skinner, 1953 & 1965). This paper describes the practices and materials that constitute such an application. It is based primarily, though not entirely, on research conducted at the University of Illinois, Urbana-Champaign (Bijou, 1971).

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Teaching and Learning

It may be helpful at the outset to clarify the meaning of the terms, teaching and learning, as they will be used here. Skinner (1965) defines

and elaborates the behavioral concept of teaching thus:

> Teaching is the arrangement of contingencies of reinforcement under which students learn. They learn without teaching in their natural environments, but teachers arrange special contingencies which expedite learning, hastening the appearance of behavior which would otherwise be acquired slowly or making sure of the appearance of behavior which might otherwise never occur (pp. 64-65).

In this definition, "contingencies of reinforcement" and "special contingencies" refer to <u>all</u> of the conditions of which learning is a function. In an educational setting, the conditions at issue may be categorized as: (1) the task to be learned, (2) the behavior required by the task, (3) the consequences of behavior to the task, and (4) situational or contextual conditions affecting the relationships among the other three conditions. These conditions are defined functionally, in terms of the reactions of the child, hence a large segment of the history of the child is taken into account in the most serviceable way, as it affects the child's actual performance.

Let us now take a discerning look at the concept of learning. In the literature of psychology and education, one finds that "learning" is used in two distinctly different ways: as a change in an interval process and as a relatively permanent change in performance (e.g., Reese & Lipsitt, 1970). Learning viewed as an internal process raises questions about its properties (whether, for example, it is hypothetical or physiological) and about the criteria differentiating learning from non-learning performance. Learning viewed as a change in performance is burdened with

the problem of differentiating between learning and non-learning behavior which centers on establishing the criteria of permanence.

It is better to dispense with the concept of learning as a term central to all of psychology, such as learning theory or social learning theory of behavior modification (e.g., Bandura, 1969), and to focus on the relationships of observable changes in behavior and their determining conditions - stimulus and response functions, setting factors, and the interactional history of the individual (Kantor, 1959). Within this general framework, the acquisition of new patterns of behavior (the usual domain of learning) and the maintenance of acquired behavior (the usual domain of personality) may be readily subsumed. However, it may be useful to refer to learning as changes in behavior that take place in a contrived situation, such as the classroom, and focus on the conditions of which such changes are a function.

Arranging conditions to facilitate learning in the classroom is a complex interactional process. At the center is the interaction between teacher and student; on the periphery are the interactions of other children and the teacher's aide. The teacher provides the tasks - instructions, questions, curricula materials, etc. The teacher defines the student's behavior in three ways: (1) by providing situations that are discriminative only for certain classes of behavior and not for others, (2) by providing positive consequences for certain classes of behavior and not for others, and (3) by arranging contextual conditions. The amount and direction of change or lack of change influence, under most circumstances, the teacher's behavior in her further interactions with the student. Thus the teacher teaches the student and the student teaches the teacher.

Programming Academic Tasks

Society, through its educational departments, school committees, boards, and administrators, determines the content of the curriculum. The sequencing of the tasks is suggested by textbook writers, manual makers, curriculum constructors, and the teacher. The teacher who has the last "say" on the preparation of progressions are only slightly influenced by the methods' courses taken in college (e.g., Allen, 1971). For the most part, the teacher's personal history, including experiences in teaching, is the most powerful determiner of how she will plan and execute her lessons.

The sequencing of materials to be learned by the children has always been a matter of serious concern to educators. At one time or another, they have advocated arrangements on the basis of logic, rules, common sense, presumed psychological principles, and developmental conceptions of the child. Programming on the basis of the developmental considerations has been particularly influential in educating the retarded. Thus, normal sequences have been extended because the retarded child has been conceived of as one who grows like a normal child only at a slower rate. Also, sequences with a great deal of redundancy have been tried because the retarded youngster has been viewed as one who learns primarily by repetition and rote. Finally, sequences have been constructed to circumvent the child's "inherent deficiencies" because most retarded children are considered organically injured and therefore require exercises which "work around" the consequential behavioral disability.

If one sees the retarded child as an individual with limited repertories of behavior (i.e., with behavioral deficits) which have evolved

from limitations and restrictions in his biological, physical, and social interactional histories (Bijou, 1966), then the sequencing of school subjects is a behavioral engineering task which requires the cooperative efforts of persons well versed in the subject matter and the principles of behavior (Skinner, 1968). Since at present we know only a few of the principles of sequencing material (e.g., materials requiring discriminated responses should precede materials requiring constructed responses), we should adhere to a heuristic procedure: identify the behavior to be learned, analyze it in behavioral terms, program it provisionally (based on the experiences of teachers), try it out on the target children, and modify it on the basis of findings. This, at any rate, has been the basis of the procedure in developing the reading, spelling, arithmetic, writing, and language programs described below.

Reading

Reading is verbal behavior under the control of the written or printed symbols of a phonetic alphabet (Sidman, 1971 and Skinner, 1957). A child is reading when his verbal behavior corresponds in a conventional way to the text, and his reading is functional when he makes responses that the listener accepts as comprehension of the material read. When a child reads orally, the only way a listener knows the child comprehends what he has read is by the child's subsequent behavior, i.e., by his responses about the material. When appearances suggest that a child is reading silently, the only way the listener knows that the child has been reading is also by his subsequent behavior (paraphrasing, for example), and the only way he knows that the child understands what he has read is by still other behavior (answering questions concerning the text, for example).

The reading program is designed to teach a child to read words, phrases, and sentences and to engage in comprehending behavior. It consists of 27 sets of graded verbal material. Every set has 10 subsets, each of which introduces a single word. Thus there are 10 words per set, and 270 words in the program. Each subset has four components: (1) picture identification, (2) reading discrimination, (3) oral reading, and (4) reading comprehension. A fifth component, stories, occurs at the end of some of the subsets. The picture identification exercise aims to assure the teacher that the child understands the meaning of each word introduced, he can answer at least one question about it. The teacher pronounces a word and asks the child to indicate by circling a "yes" or "no" face whether the word describes the picture. The reading discrimination component teaches the child (1) to select from a row of printed words or letters the written equivalent of a word spoken by the teacher or tutor, and (2) to say the word. To sharpen differential behavior, the choices are gradually increased in similarity to the samples. The oral reading aspect of the program provides experience in reading aloud (giving verbally constructed responses); the reading comprehension component requires the child to answer questions about the material read. The reading comprehension sequence is identical to the listening comprehension sequence except that the child reads the word aloud and then indicates whether the word describes the picture.

The vocabulary in the reading program is keyed to a graded series of stories in the commercially published Bank Street Readers. The opportunity to read a story from a book is given as a bonus for progress through certain units of the program. The stories are presented like the oral reading

part of the program with the teacher providing response contingencies and asking questions.

Also included in the reading program are an attending sequence, simple phonetics exercises so that the child can prompt himself when needed, and several auxiliary mini-programs such as a "plurals" sequence.

Spelling

Spelling is the production of letters, orally or in writing, which in correct sequence forms a word. In oral spelling (constructed verbal responses), the child names the letters; in written spelling (constructed textual responses), he writes the letters. Training in spelling, as in reading and arithmetic, is primarily training in bringing selective parts of the child's verbal repertory under stimulus control, i.e., arranging conditions to evoke spelling responses in writing.

The target behavior of the spelling program is writing words from dictation (making constructed written response to auditory stimuli). Before he is placed in the spelling program, the child must have made minimal progress in the reading program, and must have progressed in the writing program to the level of copying words from a typewritten model. The vocabulary list in the spelling program is taken from the reading program.

Arithmetic

Arithmetic consists of behavior primarily under the control of stimuli, both visual and auditory, which include numbers and operation symbols (+, -, =). The primary level of arithmetical behavior involves discriminated and constructed responses to numbers and operation signs, and rule-following behaviors to combinations of these stimuli. Arithmetic

behavior also includes "knowing" behavior, or "having a number concept", i.e., the child must be able to use and talk about numbers in the conventional way.

The arithmetic program aims to teach both pre-arithmetic behavior and primary-level addition and subtraction computation. The pre-arithmetic component is designed to (1) shape attending behaviors; (2) stimulate initial arithmetical responses through imitative prompting procedures; (3) provide training in chaining numbers; (4) provide training in responding to written numbers, objects, and representations of objects; and (5) provide practical techniques for adding combinations of numbers. When these skills are acquired, the child is introduced to the primary computational segment which aims to teach the addition operations including carrying. It begins with training the child to make an overt response to "plus and equal" signs, using an imitative priming procedure. Next he is taught to chain to horizontal addition problems (3+2=5). Transferring control to the vertical format is accomplished by a double presentation procedure in which the previously trained horizontal format is used to prompt correct responses to vertical stimuli. The primary subtraction component ranges from beginning concepts through multiple-column, successive borrowing problems. The sequence begins with an oral response to the minus sign, progresses to randomly alternating addition and subtraction problems to sharpen attending behavior, and then to an overt finger-counting algorithm for subtraction. The latter is faded to a covert level by requiring more and more rapid responses.

Writing

Writing is the production of written symbols that serve as discriminative

stimuli for reading, arithmetic, and problem solving. Like all motor skills, writing is acquired through the reinforcement of progressive approximations to the target behavior. Writing also involves stimulus control (e.g., paying attention to the details of the model) but the writing response itself is differentiated and integrated through contingency management.

The writing program provides training in this order: (1) holding the pencil, (2) discriminating between acceptable and unacceptable models of writing, (3) developing finer differentiated manual responses, (4) working independently of models, and (5) writing in manuscript and cursive forms. In constructing the program, the following points served as guides: (1) Training on a letter or number is continued to the point where the product approximates a specified model or topography. The terminal responses (letters and numbers) are analyzed into simple elementary parts. Letters and numbers formed by simple elements are presented before letters and numbers made from complex forms. Letters and numbers with common elements are presented together. (2) Writing skills are maintained by natural contingencies. Writing is made functional by encouraging the child to write meaningful words, stories, etc., so that the contingencies of the social environment may be operative.

Language

Language involves a minimum of three components: a speaker, the object or event spoken about, and a listener (Observer, 1970). There can, of course, be more than one listener and the speaker himself may serve as a listener. Language may have a manding (asking) or a tacting (describing) function (Skinner, 1957), the former being reinforced by the thing or event

requested or demanded, and the latter by generalized social reinforcement. Language behavior is a function of discriminative stimuli generated by the referent and the behavior of the listener, response functions, response contingencies, contextual conditions, and the histories of the speaker and the listener. Programming elementary language involves arranging conditions that increase the child's chances of being reinforced by a listener for the things and events he requests and describes.

The language program, therefore, has two aims: one to improve the child's requesting repertory, the other to increase his describing repertory. The first consists of the practices that take place daily in the class, i.e., the teacher prompts the child to ask for things in a socially acceptable manner, to say "Thanks" when helped, etc. The second is more formalized. It consists of sequences about knowledge of things and events in the immediate environment. Set I of the formal language program consists of here-and-now objects, designations, and events, such as name, address, and telephone number, primary colors, basic geometric forms, name and classification of familiar objects including furniture and furnishings, fruits, vegetables, animals, pieces of clothing, articles for toileting, and the use of school objects such as a ruler. Set II consists of more distant and abstract items such as names and characteristics of the seasons of the year, months of the year, days of the week, holidays, directions, geographical location, and words about words such as pronouns, rhyming, and synonyms. Most of the programming is designed to take place in a group situation.

So much for programming the academic tasks for the retarded child. Programming of personal-social tasks will be considered later. We now

turn to the management of response contingencies - the conditions that follow the responses to prescribed tasks.

Programming Response Contingencies

Since practically all behaviors to be learned in the classroom are sensitive to consequences, the question is not whether the teacher should arrange response contingencies to expedite learning but whether she knows how to recognize and use the response contingencies available to her. The teacher's choice and use of contingencies depend upon her psychological knowledge of task involved, the child's related repertories, and the way response contingencies strengthen and maintain behavior.

Review of Conditions that Strengthen or Weaken Behavior

The positive conditions that strengthen antecedent behavior are those providing conditions that are natural to the activity (playing in water), intrinsic to the activity (music, being with children, solving problems), and contrived (a mark or a token system). The negative conditions that strengthen behavior are those providing escape from or avoidance of aversive situations (getting away from a nagging teacher).

The conditions that weaken antecedent behavior include (1) instatement of aversive contingencies, such as corporal punishment, threats, and ridicule; (2) withdrawal of positive reinforcers, such as lowering a grade; (3) removal of opportunities for positive reinforcers, such as taking a child out of a play situation, and (4) no alteration in the situation, such as the tutor behaving as though the behavior had not occurred.

All the examples given in the above paragraph should be qualified with the phrase "for some children." In other words, one cannot say with certainty, except for stimuli with primary (homeostatic) functions, which

set of response consequences will in fact be reinforcing, aversive, or neutral for an individual child. He can make guesses on the basis of what we know about children in general, but the only way he can actually determine the functional property of a consequent stimulus for a child is by making a test of functionality: observe the frequency of some particular behavior of a child (e.g., frequency of hand raising in a group situation) and make an event contingent upon it (e.g., calling on him to give an answer). If his behavior is strengthened, that is, if he raises his hand more often, then that event (being called on) is reinforcing for him. If the behavior is weakened, that is, his hand raising decreases in frequency, the event is aversive for him. If it remains the same, the event is neutral for him.

Evaluating the reinforcing functions of stimuli for a child is not a simple, once-and-for-all affair. Continuous assessment is required, for with progress in academic and personal-social learning and with alterations in setting factors come changes in the meanings of contingencies.

Arranging Response Contingencies

Response contingencies may be arranged so as to further four important educational objectives. First, they may be arranged to strengthen the form and intensity of the antecedent behavior, as in the development of academic skills. Writing is an example. Writing is acquired most rapidly when response contingencies follow shaping procedures, delivering differential reinforcement for successive approximations of the target behavior. Among other things, this means correcting deviations from models as soon as they are made and strengthening the entire segment of the desired response.

Second, response contingencies may be arranged to increase the probability of academic behavior on a given occasion, as in reading ("Read this word."), spelling ("Spell city."), arithmetic ("How much are 2 plus 1?"), or language ("What's your name?"). Techniques of priming the response, reinforcing successive approximations to the desired attending behavior, and reinforcing differential responding are involved here. All are used for the ultimate purpose of making the required response highly probable under a wide range of contextual variations.

Third, response contingencies may be programmed to increase the probability of desirable personal-social behaviors. The pattern of reinforcement for a class of behavior over a period of time, that is, the schedule of reinforcement, not only strengthens the form and probability of the antecedent behavior but also establishes other behaviors, many referred to as personality traits. For example, an increasing ratio schedule of reinforcement (gradual changing from reinforcing every correct response on a page to reinforcing to a full page of correct responses) may be used to get a child to work productively for longer periods. When this schedule of reinforcement has had its terminal effect, the child is described "as having good study habits," or "as knowing how to work independently."

Fourth and finally, response consequences may be arranged to develop new interests, incentives, and values, or to reinstate old ones. The technique used for this purpose is to pair a neutral or weak stimulus consequence with one of demonstrated reinforcing properties for the child. For example, a percentage reinforcement schedule describes the proportion of time a contrived reinforcer (e.g., marks) is given together with a social reinforcer ("Good work."). The proportion of pairing may be fixed

(e.g., pairing takes place 50% of the time), or it may vary on an increasing or decreasing sliding scale. A sliding scale, with a decreasing frequency of pairing (e.g., 100%, 80%, 60%, etc.), may be used to "fade out" the use of contrived reinforcers.

Programming Setting Factors

It will be recalled that setting or contextual factors refer to the circumstances in which learning interactions take place. Setting factors, which include a variety of specifiable events, affect the functional properties of all the other conditions of learning. These factors may originate in the child, in the behavior of the teacher, in the physical and social structure of the classroom, in the operation of the class, and in the society. The teacher programs those under her control, and attempts to deal with or work around those not under her control.

Setting factors originating in a child include his physical health, his emotional predisposition (e.g., a constant condition of anxiety, his state of hunger, fatigue, or sleep). An example of improving the children's emotional predisposition is the practice of greeting the children as they arrive in the morning, serving them breakfast, encouraging them to talk about what they did during the previous afternoon and evening, or before coming to school that morning, and reinforcing happy talk. Relaxed conversations of this sort not only prime desirable emotional behavior but facilitate communication and strengthen social relationships.

Setting factors from the teacher include her general emotional behavior, her attitude toward the potential development of each child, and her disposition toward each child as a human being. A pleasant emotional tone contributes heavily toward making the classroom an attractive place,

and a favorable, optimistic attitude toward each child's potentiality is a short-hand expression for what she says and does in relation to his learning efforts. For example, when a child is making reasonable progress in a subject, it can be assumed the materials, response contingencies, and setting factors are functioning well for him. On the other hand, when he falters, the assumption is that these conditions are inadequate for him, and it is therefore encumbent on the teacher to analyze the situation, modify the situation, evaluate the revision until the child makes progress.

The appearance and social structure of the classroom and the daily class plan are setting factors. The classroom can be a place where a child likes to be, the daily schedule an instrument to enhance learning, and the social atmosphere (the character of the classroom as a social group) a setting for enthusiastic participation and productivity.

Setting factors originating in the society may be national and state holidays, the practices of school organizations such as the visiting activities of the school board and the parent-teachers association. Societal setting factors affecting the group interact with setting factors affecting individual children. Thus, the Christmas season affects each child according to his own personal history together with factors that may be operating currently, e.g., the threat of a father losing his job, serious illness in the family, etc.

Programming Personal-Social Traits

In actuality, the special-class curriculum for the young retarded child consists of two programs operating simultaneously: sequences for teaching basic academic skills, abilities, and knowledge; and sequences

for teaching precurrent academic behavior ("study habits"), self-control, and other personal-social behaviors prescribed by the classroom culture. The development of these desirable behaviors requires, in some instances, the simultaneous weakening or elimination of interfering behavior, such as frequent destructive behavior. In other instances, only a program of differential reinforcement for successive approximations to the target behavior may be required.

Technologically, the procedures for teaching personal-social traits are no different from teaching academic subjects. Both require: (1) specifying, in behavioral terms, the target behavior, (2) assessing the present relevant behavior, (3) planning the treatment sequence, (4) assessing progress, (5) revising the sequence as indicated, and (6) maintaining the behavior acquired.

Precurrent Behavior

The precurrent behaviors for reading, arithmetic, writing, spelling, and language are relatively easy to designate. They all have certain common features, such as getting into a comfortable position to perform the task, properly orienting the head, etc. At the same time, each subject has certain unique features. The observing skills required to read a word or sentence in a reading unit are quite different from those required to do a sum in arithmetic, and the precurrent behavior for writing and language, although both involve constructed responses, take different forms. It will be recalled that the reading program includes an attending sequence.

The techniques for establishing the common segment of precurrent academic behaviors aim to weaken interfering behavior through (1) extinction (ignoring the undesirable behavior), (2) teacher "time-out" (looking away,

contingent on the child's distractable behavior, and looking back, contingent on resumption of the desirable behavior). Target behaviors are strengthened simultaneously through (1) primes (e.g., modeling: "I like the way Jimmy is working.") and prompts (e.g., "Try doing it this way."), and (2) positive reinforcement of closer and closer approximations to desired precurrent behaviors.

Personality Traits

Other targets of the implicit curriculum are those behaviors required by the demands or moral code of the society, among them, social relationships with adults and peers, sexual behavior, self-care, treatment of property, etc. Also included are those highly cherished, vaguely defined traits with an intellectual flavor such as good problem-solving ability, creativity, and enthusiasm for learning and discovery. The behaviors in this category that attract public attention are those that help advance academic objectives.

Behaviors that are antithetical to or interfere with the development of desirable or acceptable personal-social behaviors range from mild to severe in their disruptiveness. Severe forms include hitting, biting, spitting, throwing objects at a person, pulling hair, damaging property, intruding upon another child's ongoing activity, ridiculing a child's problem or physical handicaps, and running out of the classroom, play yard, or school building. Milder forms are all other behaviors that impinge upon the rights of the children to be happy and productive in their class. Some examples: refusal to comply with requests, excessive and persistent questions, loud talking and yelling, annoying other children, and behaving in ways that are incompatible with the class activity without requesting permission.

Programming the replacement of serious problem behaviors with desirable social behaviors involves (1) weakening or eliminating the undesirable behavior by techniques that do not generate detrimental "side-effects," and that at the same time, (2) strengthen desirable behaviors in ways that maintain and generalize them. The procedures that weaken or eliminate problem behavior without creating other undesirable behavior include extinction, removing the occasion for the response, contingent loss of positive reinforcers and time-out from opportunities for positive reinforcement, setting up contextual conditions that inhibit undesirable behaviors, and competition by other behavior. On the other hand, techniques that strengthen desirable behavior and promote their maintenance and generalization are those which utilize positive reinforcement contingencies. Ideally, the positive reinforcers should be natural and intrinsic to the classroom. If those that are available are not reinforcing to a child, then contrived reinforcers are indicated with the proviso, however, that the programming include procedures to strengthen the usual reinforcers available to the teacher.

To replace mild problem behaviors with desirable social behaviors requires differential strengthening of competitive desirable behavior in conjunction with either extinction or "teacher time-out." It also requires priming and prompting techniques to boost the strength of the desired behavior, fading procedures "to transfer" behavior to everyday circumstances, and schedules of reinforcement to maintain the behavior acquired.

Assessment, Program Planning, and Modification

Assessment of a child's entrance repertory at school entrance, his progress throughout the school year, and his terminal behaviors is done by

the teacher. In this way, she obtains first-hand acquaintance with just what the child can do, his style of performance, and his responsiveness to social circumstances and response contingencies. This direct knowledge is far more helpful to her than a written account by someone whose responsibility to the child is already finished.

Entrance Assessment and Program Planning

The teacher's entrance assessment is based on (1) observational data from the child's last day or two in the school classroom from which he is being removed, if he has previously been in school, and during his first week in the classroom, (2) tests from the reading, writing, arithmetic, spelling, and language programs, or criterion-referenced tests (Glaser, 1963), (3) standardized norm-referenced intelligence and achievement tests, and (4) information from medical and school reports and from interviews with the mother, previous teacher, and the school psychologist. From these sources, she learns about (1) the child's specific skills in academic subjects and social behavior; (2) the kinds of social relationships, objects, and activities that may be reinforcers, and (3) the support she may expect from the parents. On the basis of (1) and (2), she prepares the initial instructional program for the child.

Program Assessment and Program Modification

Because of each child's uniqueness, it is expected that the programs will not be adequate without alterations and that contingencies originally planned for him will have to be changed as he develops, learns, and responds to the classroom situation. It is imperative, therefore, that the child's behavior be monitored throughout the school year. Furthermore, since lack of progress is not attributed to inner attributes of the child

but to circumstances, monitoring the teaching interaction is the only sensitive way to determine the necessity for program modification.

There are five types of monitoring techniques. The first is the subjective impressions of the teacher. A subjective report on a child is vital if for no other reason that it may furnish the beginning point for objective monitoring. The second technique utilizes the actual products of the child's performance and is generally confined to the academic programs. Completed writing assignments, sheets of arithmetic problems, written spelling pages, and tape recordings, are scrutinized, scored, and entered on the child's progress chart. The third technique, used primarily in tutoring, produces information on the frequencies of correct and incorrect responses and the contingencies (i.e., social comments and marks) in force. These data are used not only to evaluate the child 's progress, but to assess both the behavior of the tutor and the adequacy of the program. The fourth monitoring technique is the pre- and posttests based on instructional materials. It, too, not only assesses the child's progress but also the efficiency of the academic programs. The fifth, and final, monitoring technique consists of simple frequency counts of occurrences of some personal-social behavior (Bijou, Peterson, & Ault, 1969; and Bijou, Peterson, Harris, Allen, & Johnston, 1969).

Terminal Assessment and Report

In the terminal assessment, the teacher readministers the standardized tests, determines the child's terminal mastery level in each of the academic programs by readministering the general program pretests, and reassesses the problem behavior given as the reason for the original referral. The teacher's final report, written for persons who will next

have primary responsibility for him, is a description of the child's academic and social behavior at the beginning and end of the school year. The end-of-year summary includes a description of the child's actual skills and knowledge. Also described in detail are the terminal contingencies which were successful with the child.

Recommendations are usually limited to the academic materials and procedures that have been used, and to the specific techniques that have resulted in strengthening essential and desirable behaviors and weakening undesirable behaviors.

Training Others

Even when she is provided with well-programmed materials and serviceable teaching aids, the special education teacher using behavior principles needs an aide or an assistant (Sobey, 1970). She also requires the active support of parents to make the learning take place in the classroom more functional. To assure continuity and consistency, both her aide and the child's parent or parents should be trained by the teacher. The aide should learn to assemble each child's daily assignments in each subject, to prepare remedial programmed sets, to monitor the teaching-learning interactions, to tutor academic subjects, and to supervise small-group learning situations. Teacher and aide should periodically monitor each other's interactions with the children so as to reassess their teaching techniques.

It is perhaps appropriate to note at this point that the general conditions that expedite learning in children are applicable to the training of parents, teaching assistants, and teachers as well. One must take into account the nature of the task, the consequences of the responses to be

learned, and the setting factors. Most important of all the tasks is learning to respond differentially to the child's appropriate and inappropriate behaviors. A first approximation to this skill is the mastery of objective monitoring techniques. A teacher cannot reinforce what she does not see. In shaping writing skills, for example, slight improvements must be detected and strengthened. Another crucial task is familiarity with manuals which outline the mechanics of the academic programs, closely followed by field experience. Thus, in learning to tutor reading, the trainee should first read the administration manual for the reading program, then take correct and incorrect response data in actual reading sessions until she achieves high scoring reliability, and then gradually take over the tutoring situations.

An extension of this sequence is recommended when the trainee is a parent. Many parents and their children share long histories of learning interactions which may be largely maladaptive. The mere presence of the parent may be a setting factor that drastically reduces the classroom teacher's reinforcing value and increases the probability of emotional behaviors on the part of the child. Thus, parents should be initially trained with children other than their own until they have mastered the behaviors involved in programmed instruction.

Training is enhanced by setting factors which include an optimistic attitude toward the child's potential ability (i.e., a resistance toward labeling the child as unable to learn or to behave well), a good social relationship between teacher and trainee, and a willingness on the part of the trainee to acquire new ways of helping a child to learn.

Fortunately, the consequences of good teaching are usually immediate

and highly reinforcing - the child acquires new behaviors. Graphs of the child's progress often help to show the progress actually made.

Summary and Conclusions

The special class for young retarded children should be equipped to deal simultaneously with two broad classes of behavior: (1) academic behaviors and (2) personal-social behaviors. The former have been discussed at greater length reflecting the relative maturity of programs designed to teach academic skills, abilities, and knowledge as opposed to programs for self-control, study habits, etc. There are at least three reasons for this differential development. First, curriculum design has been the concern of educational researchers for many years. A storehouse of useful academic materials is available and should be drawn upon. In contrast, attempts to modify maladaptive behaviors by the systematic use of positive reinforcement contingencies are a relatively recent phenomenon. Second, it is far simpler to monitor academic behaviors under external stimulus control than it is to monitor behaviors under the control of self-generated stimuli. The child's academic output or pre- and posttest results can be used on the one hand while continuous objective monitoring of the child's social behaviors is necessary on the other. With a few exceptions, investigators have not conducted long-term ecological research. Third, diversive elements of society often disagree as to the nature of desirable personal-social behaviors. For example, it is easy to specify terminal arithmetic behaviors, but there is no consensus concerning the adaptiveness of aggressive behavior. Future efforts should be directed toward the construction of core programs in the personal-social area. Training children in self-control techniques and study skills constitute at least half of the special education teacher's job.

In every section of this paper the need for an individualized approach to materials and procedures has been stressed because it is not an option but an integral part of the technology of teaching. Remedial units of core academic programs should be designed for the individual child's particular problems. Response contingencies that strengthen one child's behavior may be aversive or neutral to another child, hence consequences must be evaluated separately for each child. A given setting factor may operate for the group or for a single child since the past history of each child is unique. In short, efficient programs may be developed for general use with retarded children but each program be tailored specially to the individual needs of each child.

The development of an empirically based educational technology for the retarded child is dynamic and progressive. The relationship between teacher and child is entirely reciprocal. The teacher teaches the child and the child teaches the teacher. Consequently materials and procedures are systematically changing. It is this property, in combination with the steady accumulation of empirical fact, that provides promise to a behavioral approach to education.

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Footnote

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